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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,108	09/30/2003	Soumyadeb Ghosh	126344-1	4989

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EXAMINER
SANDERS, KRIELLION ANTIONETTE

ART UNIT	PAPER NUMBER
1796	

MAIL DATE	DELIVERY MODE
03/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/675,108	GHOSH ET AL.	
	Examiner	Art Unit	
	Kriellion A. Sanders	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 9-25* is/are pending in the application.

4a) Of the above claim(s) *17-23 and 25* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,9-16 and 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-25* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the communication submitted by applicant on March 11, 2008, after final rejection. Applicant's arguments have been found persuasive to withdraw the previous grounds of rejection. However in view of new prior art, the following non-final rejection is submitted.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 9-16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dzenis, US Patent No. 6,265,333 in view of Nahass et al, US Patent No. 5,591,382, (previously relied upon).

The patented invention is directed to a composition of a fiber reinforced composite material comprising a resin matrix and primary reinforcement fibers and further comprising secondary reinforcement fibers at one or more ply interfaces wherein the secondary reinforcement fibers have diameters smaller than the primary reinforcement fibers.

Patentee indicates that the primary reinforcement fiber materials are added to the resin system to provide strength to the finished part. The selection of reinforcement material is based on the properties desired in the finished product. These materials generally do not react with the resin but are an integral part of the composite system. The invention is not limited to the use of any particular primary reinforcing fiber. Any suitable fiber or filamentary material may be used

as the primary reinforcement in the layers of composite material according to the invention. Such primary reinforcement fibers are generally known in the art and include, but are not limited to alumina, aluminosilicate, aramid (such as Kevlar.RTM., Twaron.RTM., or other aramid fibers), black glass ceramic, boron (e.g., boron on titania, boron on tungsten, and so forth), boron carbide, boron nitride, carbonaceous fibers, such as carbon or graphite fibers. The types of fiber most commonly used in advanced composites are carbon/graphite, aramid, and glass fibers. The primary reinforcement fibers may be present in any of the various conventional forms. Such forms include, for example, monofilament fiber, multifilament yarn, tow, or roving, chopped strand, acicular particles.

The composite systems of the invention are divided into two basic types, thermosets and thermoplastics, with thermosets being by far the predominant type.

The diameter of the secondary reinforcement fibers will depend on the diameter of the primary reinforcement fibers. The diameter of the secondary fibers is sufficiently small if it provides laminate interface reinforcement without substantial reduction of in-plane properties and/or without substantial increase in weight and/or ply thickness. Typically, the smaller diameter secondary fibers according to the invention will generally have a diameter of approximately one-third, or less, of the diameter of the primary reinforcing fiber. For example, if it is desired to employ fibers having a diameter of several micrometers as the primary reinforcing fibers (such as graphite fibers having a diameter of about 5-7 micrometers as may be typically employed in advanced composites), then fibers of submicron diameters (hereinafter referred to as "nanofibers") will be required as the secondary reinforcement. Several types of

small diameter fibers are available. These include, but are not limited to, ceramic or metal whiskers, microdrawn metals and small carbon fibers,

Patentee claims a laminate comprising a plurality of stacked layers, said layers forming an interface between each pair of adjacent layers, said layers comprising a matrix material and primary reinforcing fibers, and said laminate further comprising secondary reinforcing fibers present in at least one interface, or one or more portions of said at least one interface, wherein said secondary fibers are smaller in diameter than said primary reinforcing fibers, and wherein the presence of said secondary reinforcing fibers do not substantially add to the thickness of said laminate, said secondary reinforcing fibers having a diameter less than 4000 nanometers and at least 3 nanometers.

The laminate according to claim 1of the patented invention includes a secondary reinforcement fiber comprising one or more microfibers or nanofibers selected from the group consisting of metal fibers, carbon fibers, ceramic fibers, polymer fibers, and any combination thereof.

The laminate includes a matrix material that is a thermosetting resin.

Or a thermoplastic resin. The ratio of primary reinforcement fiber diameter to secondary reinforcement fiber diameter is about 100:1 or greater.

See col. 5, line 1 through col. 8, line 39 and Table I. Also, see specifically claims 1, 4, 5 and 6.

It would have been obvious to one of ordinary skill in the art at the time of applicant's invention to formulate a conductive polymeric composition including carbon fibers as the

secondary reinforcing fibers having a diameter less than 4000 nanometers and at least 3 nanometers, having graphite as the primary reinforcing fiber wherein the ratio of primary reinforcement fiber diameter to secondary reinforcement fiber diameter is about 100:1 or greater. Patentee clearly states, "For example, if it is desired to employ fibers having a diameter of several micrometers as the primary reinforcing fibers (such as graphite fibers having a diameter of about 5-7 micrometers as may be typically employed in advanced composites), then fibers of submicron diameters (hereinafter referred to as "nanofibers") will be required."

It is common to form carbon fibers from polyacrylonitrile or pitch. Nothing unobvious is seen in using fibers derived from these components. See Nahass et al at col. 1. lines 28-35.Since the components of the presently claimed invention are obvious their associated properties, such as electrical conductivity and viscosity are also considered to be inherently present in the patented compositions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kriellion A. Sanders whose telephone number is 571-272-1122. The examiner can normally be reached on Monday through Thursday 8:30am-7:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kriellion A. Sanders/

Primary Examiner, Art Unit 1796

Kriellion A. Sanders
Primary Examiner
Art Unit 1796

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